Amendments to the Claims

This listing of claims will replace all prior listings of claims in the application.

Listing of Claims

1. (Cancelled).

2. (Cancelled).

3. (Currently Amended) The texturing system according to ~~claim 2, in which the~~Claim 10 wherein:

said decompression means ~~is connected with its~~has an input directly coupled to ~~the~~said cache means and ~~its~~an output~~, coupled both to the trilinear interpolator means and to the lower-level mip-map generator means~~.

said trilinear interpolator means is directly coupled to the output of said decompression means; and

said lower-level mip-map generator means is directly coupled to the output of said decompression means.

4. (Currently Amended) The texturing system according to ~~claim 2, in which~~Claim 10 wherein:

— there are four said cache means ~~and four decompression means~~ arranged in parallel and:

there are four said decompression means arranged in parallel.

5. (Cancelled).

6. (Currently Amended) The texturing system according to Claim 10, ~~in which the~~wherein said lower-level mip-map generator means comprises four interpolators which operate on 16 texels from the mip-map data held in the cache means to provide four texels ~~as from the next lower~~for the next below level mip-map.

7.   (Cancelled).

8.   (Currently Amended) ~~Apparatus~~An apparatus for generating texture data for use in texturing an image, ~~comprising the steps of~~said apparatus including:

means for representing texture data by arbitrary compressed codes, in which selected compressed code values define principal colors and other compressed code values define colors which can be formed by selected weighted averages of <u>the</u> principal colors, the corresponding code values also being weighted averages of the code values of ~~the~~ selected principal colors; and

interpolating means for interpolating an output texel from a plurality of input texels~~,~~

~~characterized in that:~~

~~the interpolating means effects the interpolation using compressed code values~~, <u>wherein said interpolating means performs an interpolation to generate texture data for the output texel using compressed code values received from said means for representing texture data</u>.

9.   (Currently Amended) A method of generating texture data for use in texturing an image, <u>said method </u>comprising the steps of:

representing texture data by arbitrary compressed codes, in which selected compressed code values define principal colors and other compressed code values define colors which can be formed by selected weighted averages of principal colors, the corresponding code values also being weighted averages of the code values of ~~the ~~selected principal colors;<u> and</u>

interpolating an output texel from a plurality of input texels~~,~~

~~characterized in that:~~

the interpolating step is effected using compressed code values., wherein said interpolation step is performed by using the compressed code values generated in said step of representing texture data by arbitrary compressed codes.

10. (Currently Amended) A texturing system for use in a three-dimensional imaging system, and comprising:

memory means for storing mip-map data for use in texturing an image, the mip-map data comprising a hierarchical series of mip-maps of different levels of decreasing resolution, said memory means configured to store the mip-map data in compressed form;

input means for receiving input data indicating the type of mip-map data required and the level of the mip-map or mip-maps from which the data is to be taken obtained;

control means coupled to the said input means and to the said memory means for retrieving from said memory means the compressed mip-map data for a selected mip-map level required in accordance with the input data; and

cache means coupled to the said control means for storing portions of the compressed mip-map data retrieved from said memory means for and relating to a the selected mip-map level;

decompression means connected to said cache means for receiving from said cache means the compressed mip-map data, said decompression means configured to decompress the mip-map data to produce decompressed mip-map data;

lower-level mip-map generator means coupled to said the cache means for generating portions receiving the mip-map data, said lower-level mip-map generator configured to produce at least a portion of the mip-map for the next below mip-map level in the hierarchical series of mip-maps of for which portions area portion is held in the cache means; and

trilinear interpolator means coupled to the cache said decompression means to receive the decompressed mip-map data from one for the selected level of mip-map and to

~~the~~said lower level mip-map generator to receive mip-map data ~~from~~for the ~~mip-map~~ next below mip-map level in the hierarchical series and to interpolate an output texel from input texels contained in the mip-map data from the two received mip-map levels.

11. (Currently Amended) The texturing system of Claim 4, further ~~comprising~~ including a first allocating means located between ~~the~~said four cache means and ~~the~~said four decompression means~~,~~ for selectively allocating the outputs of said different caches to selected ones of ~~the~~said decompression means.

12. (Currently Amended) The texturing system of Claim 4, ~~in which the~~wherein said lower-level mip-map generator means comprises four interpolators which operate on 16 texels from the mip-map data held in the cache means to provide four texels ~~as from the next lower~~for the next below level mip-map.

13. (Currently Amended) The texturing system of ~~Claim 5~~Claim 3, ~~in which the~~wherein said lower-level mip-map generator means comprises four interpolators which operate on 16 texels from the mip-map data held in the cache means to provide four texels ~~as from the next lower~~for the next below level mip-map.

14. (Currently Amended) A method of texturing for use in three-dimensional imaging, and comprising the steps of:
storing in a memory mip-map data for use in texturing an image, the mip-map data comprising a hierarchical series of mip-maps of different levels of decreasing resolution wherein, in said step of storing, the mip-map data are stored in compressed form;

receiving input data indicating the type of mip-map data required and the level of the mip-map or mip-maps from which the data is to be ~~taken~~obtained;

retrieving from the memory the compressed mip-map data for a selected mip-map level required in accordance with the input data;

storing in a cache portions of the compressed mip-map data retrieved from the memory ~~and relating to a~~for the selected mip-map level; ~~and~~

decompressing the compressed mip-map data stored in the cache to produce decompressed mip-map data for the selected mip-map level

~~generating,~~ in real-time, mip-map data for portions of the mip-map for the next below mip-map level in the hierarchical series of mip-maps ~~of which portions are held in the cache means~~ from the selected mip-map level, wherein said generation of the mip-map data is performed using the mip-map data for the selected mip-map level stored in the cache; and

~~interpolating an output texel from input texels from the mip-map level stored in the cache and the mip-map next below in the heirarchical series generated in real-time.~~ performing a trilinear interpolation on the decompressed mip-map data for the selected mip-map level and the generated mip-map data for the next below mip-map level to generate an output texel from the two levels of mip-map data.

15. (New) The texturing system of Claim 11, wherein:

a first one of said decompression means receives compressed mip-map data from a selected one of said caches through said first allocation unit and supplies a maximum of four texels for selection as upper mip-map texels;

a second one of said decompression means receives compressed mip-map data from a selected one of said caches through said first allocation unit and supplies a maximum of two texels for selection as upper mip-map texels;

a third one of said decompression means receives compressed mip-map data from a selected one of said caches through said first allocation unit and supplies a single texel for selection as an upper mip-map texel;

a fourth one of said decompression means receives compressed mip-map data from a selected one of said caches through said first allocation unit and supplies a single texel for selection as an upper mip-map texel; and

means for selecting upper texels is connected to said four decompression means for receiving the texels and is configured to selectively apply the texels supplied by said four decompression means to said trilinear interpolator means as the decompressed mip-map data for the selected mip-map level.

16. (New) The texturing system of Claim 15, wherein said means for selecting upper texels is a second deallocator.

17. (New) The texturing system of Claim 4, wherein said lower-level mip-map generator comprises:

said four decompression means; and

four filtering means, each said filtering means being connected to a separate one of said decompression means, each said decompression means-filtering means pair being configured to produce a texel for the next below level mip-map by filtering the mip-map data in said decompression means while the mip-map data is in a compressed form.

18. (New) The texturing system of Claim 17, wherein each said decompression means-filtering means pair comprises a scaler filter and an interpolation means.

19. (New) The texturing system of Claim 11, wherein said lower-level mip-map generator comprises:

said four decompression means; and

four filtering means, each said filtering means being connected to a separate one of said decompression means, each said decompression means-filtering means pair being configured to produce a texel for the next below level mip-map by filtering the mip-map data in said decompression means while the mip-map data is in a compressed form.

20. (New) The texturing and system of Claim 19, wherein each said decompression means-filtering means pair comprises a scaler filter and an interpolation means.

21. (New) The method of texturing of Claim 14, wherein:

said step of decompressing the compressed mip-map data is performed by a decompressing means that receives the compressed mip-map data directly from the cache in which the compressed mip-map data are stored; and

said step of generating mip-map data for the next below level mip-map is performed on decompressed data obtained in said step of decompressing the mip-map data.

22. (New) The method of texturing of Clam 14, wherein:

in said step of storing the compressed mip-map data, the compressed mip-map data are stored in four caches; and

in said step of decompressing the compressed mip-map data, the decompression is performed by four decompressing means.

23. (New) The method of texturing of Clam 14, wherein:

in said step of storing the compressed mip-map data, the compressed mip-map data are stored in four caches;

in said step of decompressing the compressed mip-map data, the decompression is performed by four decompressing means; and

prior to said step of decompressing the compressed mip-map data, the compressed mip-map data stored in the individual caches are selectively allocated to different ones of the decompression means.

24.   (New) The method of texturing of Claim 14, wherein said step of generating mip-map portions for the next below mip-map level is performed by four interpolators which operate on 16 texels from the mip-map data stored in the cache to provide four texels for the next below mip-map level.